

A European multicenter study on the audiometric findings of styrene-exposed workers

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The objective of this multicenter, cross-sectional study was to evaluate the auditory effect of occupational exposure to styrene. It was conducted by occupational health institutes in Finland, Sweden and Poland, as part of NoiseChem, a research project funded by the European Commission 5th Framework Programme. Participants' ages ranged between 18-63 years (N=1,620 workers, 1,276 male and 312 female respondents). Participants exposed to styrene, alone or in combination with noise, were from manufacturing plants of reinforced fiberglass products (n= 862). Comparison groups were comprised of workers either exposed to noise alone (n= 400) or controls (n= 358) from various industries. The medical history, audiometric and exposure data collected by each laboratory was combined for analysis. Styrene exposure was evaluated in air collected by passive samplers from the breathing zone of participants and through the biological monitoring of mandelic acid and creatinine in the urine. Styrene exposure, measured in air or urine, was associated with poorer hearing thresholds at several of the test frequencies. Age and styrene exposure measured in air were the variables that met the significance level criterion in the multiple logistic regression for the binary outcome 'hearing loss' ($p < 0.0001$). Noise exposure was not significant as a variable by itself, but interacted significantly with styrene exposure ($p < 0.0001$). In a second model, age, gender and urinary mandelic acid were the variables that met the significance level criterion in the multiple logistic regression ($p < 0.0001$, $p < 0.03$ and $p < 0.001$, respectively). Our findings indicate that exposure to styrene has a toxic effect on the auditory system.

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